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INTELLECTUAL PROPERTY LAW

July 6, 2005

Mail Stop Certificate of Corrections Branch  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Re: U.S. Patent No.: 6,865,275 B1  
Issued: March 8, 2005  
Inventor: Hans-Ueli Roeck  
Our Docket: 32558

Certificate  
JUL 14 2005  
of Correction

Sir:

A Certificate of Correction under 35 U.S.C. 254 is hereby requested to correct Patent Office printing errors in the above-identified patent. Enclosed herewith is a proposed Certificate of Correction (Form No. PTO-1050) for consideration along with appropriate documentation supporting the request for correction.

It is requested that the Certificate of Correction be completed and mailed at an early date to the undersigned attorney of record. The proposed corrections are obvious ones and do not in any way change the sense of the application.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below.

Michael W. Garvey

Name of Attorney for Applicant(s)

Signature of Attorney

Date

6/1/05

JUL 18 2005

U.S. Patent No.: 6,865,275 *Bl*

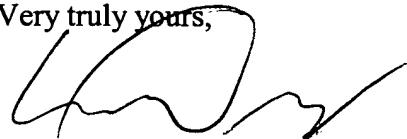
Issued: March 8, 2005

Atty. Docket No.: 32558

Page 2 of 2

We understand that a check is not required since the errors were on the part of the Patent and Trademark Office in printing the patent.

Very truly yours,

A handwritten signature in black ink, appearing to read "Michael W. Garvey".

Michael W. Garvey, Reg. No. 35878

MWG/jl  
Enclosures

JUL 18 2005

UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION

PATENT NO. : 6,865,275 B1  
DATED : March 8, 2005  
INVENTOR(S) : Hans-Ueli Roeck

PAGE 1 OF 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the cover page:

Item (30) References Cited, FOREIGN APPLICATION PRIORITY DATA, please delete  
"March 31, 2005 (CH) CHOO/00190" and insert therefor –March 31, 2005 (WO) PCT/CHOO/00190–

Column 1, line 25, please insert a space between "φ" and the word "multiplication".

Column 4, line 26, please insert a space between "φ" and the word "filter".

Column 3, line 23, please delete the "n" and insert therefor --π--.

Column 7, line 17, please delete "product to" and insert therefor –product [ ] to--.

Column 7, line 21, please delete "at".

Column 10, line 36, please delete "([ ]" and insert therefore –[ ]–.

MAILING ADDRESS OF SENDER:

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PATENT NO. 6,865,275

No. of additional copies

⇒ 0

JUL 18 2005



## A METHOD TO DETERMINE THE TRANSFER CHARACTERISTIC OF A MICROPHONE SYSTEM, AND MICROPHONE SYSTEM.

The present invention relates to a method defined in the preamble of claim 1 and to a  
5 microphone system defined in claim 9.

When receiving and processing acoustic signals, there is frequently a need to design  
microphone systems with a transfer characteristic such as to generate the electrical output  
signal as a predetermined or predeterminable function of the angle of incidence of the acoustic  
signals. In particular there is a need to design microphone systems with a predetermined or  
10 predeterminable directional characteristic such that acoustic signals from certain directional  
ranges shall be at a higher gain, from other zones at lesser ones, when transforming them into  
the output signal, and this need extends to systems with a unidirectional receiving  
characteristic.

Many procedures are known to implement such transfer characteristics. Illustratively  
15 the state of the art comprises the patent documents WO99/04598, corresponding to US  
09/146,784 ( $\phi$  multiplication) or WO99/09786 corresponding to US 09/168,184 ( $\phi$  filter control)  
of this applicant, whereby, basically, desired microphone-system transfer characteristics are  
obtained from the phase shifts of acoustic signals incident on said microphone systems and  
by appropriately processing of said signals.

20 The objective of the present invention is to propose another method to implement a  
desired transfer characteristic in the above-discussed sense.

This problem is solved by the invention by a method of the initially cited kind wherein  
25 the microphone system comprises at least two microphone sub-systems of which the transfer  
characteristics differ in relation to said direction regarding the electric output signals of each,  
and in that the output signal is formed as a mathematical product which is saturated at a  
predetermined or predeterminable value, the ratio of the output signals from the said  
microphone sub-assemblies being a factor in said product.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**Appl. No.** : 09/542,036      **Confirmation No.:** 4899  
**Applicant** : Hans-Ueli Roeck  
**Filed** : 04/03/2000  
**TC/AU** : 2644  
**Examiner:** Corey P. Chau  
**Docket No.** : 32558  
**Customer No.:** 00116

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

AMENDMENT "A"

Sir:

The three month response period to the outstanding Office action of September 24, 2003 expired on December 24, 2003. Applicant's attorney hereby petitions and requests a one (1) month extension of time to extend the response period from December 24, 2003 through January 24, 2004. A check which includes the \$110.00 extension of time fee is enclosed. By this amendment, claims 1-19 (which included multiple dependencies for a previous total of 80 claims) have been canceled. Thirty-six (36) total claims are now pending including five (5) independent claims. A check which includes the \$172.00 additional independent claim fee in excess of three is enclosed. The total enclosed check amount is \$282.00.

In response to the Office action of September 24, 2003, paper no. 7, please amend the above-identified application as follows:

**Amendments to the Specification** begin on page 2 of this paper.

**Amendments to the Claims** are reflected in the listing of claims which begins on page 22 of this paper.

**Amendments to the Drawings** begin on page 22 of this paper and include attached replacement sheets.

**Remarks/Arguments** begin on page 23 of this paper.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below.

Robert F. Bodi

Name of Attorney for Applicant(s)

01-26-2004

Date

Signature of Attorney

Please amend the last paragraph on page 4, continuing on page 5, as follows:

This ratio leads to the function  $Q$  shown qualitatively in dot-dash lines in Fig. 2 with a singularity at  $\phi = \pi$ . When the ratio is real, the singularity resulting at the null position of the denominator  $[(|c_a|) - |c_n|]$  is anyway clipped, that is, the ratio function  $Q$  is saturated. Preferably the ratio is saturated at a predetermined or predeterminable value  $B$ , preferably as shown in Fig. 3 at the value "1" at the maximum value of the transfer functions of Figs. 1a, 1b of "1".

Please amend the paragraph at the bottom of page 5 and continuing to the top of page 6 as follows:

For reasons of clarity, the saturated-ratio function  $Q_{sat1}$  is shown with a linear gain scale in Fig. 3 at 1. Fig. 3 further shows that in the unsaturated angular ranges, in the present case between 0 and  $\frac{1}{2}\pi$  and between  $3\pi/2$  and  $2\pi$ , the saturated ratio  $Q_{sat1}$  is a directional transfer-characteristic function. If now specific directional characteristics are desired for the transfer characteristic, then the range of the ratio which was set in the invention to a predetermined saturation value, in this case to 1, shall be used to achieve therein, that is within this

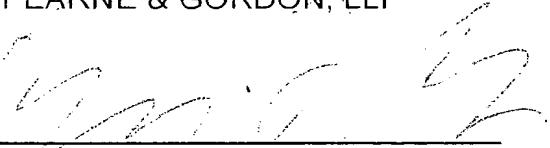
those claims are patentable over the reference for that reason as well. Claims 52-55, which depend, directly or indirectly, on claim 51, are patentable over the references for at least the same reasons as claim 51.

In consideration of the foregoing analysis, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. 32558.

Respectfully submitted,

PEARNE & GORDON, LLP

By: 

Robert F. Bodi, Reg. No. 48,540

1801 East 9<sup>th</sup> Street  
Suite 1200  
Cleveland, Ohio 44114-3108  
(216) 579-1700

January 26, 2004

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 09/542,036 Confirmation No.: 4899  
Applicant : Hans-Ueli Roeck  
Filed : April 3, 2000  
TC/AU : 2644  
Examiner: : Corey P. Chau  
Docket No. : 32558  
Customer No.: 00116

Mail Stop AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

AMENDMENT "B"

Sir:

The three month response period to the outstanding Office action of April 22, 2004, expired on July 22, 2004. Applicant's attorney hereby petitions and requests a one (1) month extension of time to extend the response period through August 22, 2004. A check which includes the \$110.00 extension of time fee is enclosed.

This paper is in response to the Office action of April 22, 2004, paper no. 9, and the personal interview of July 28, 2004, paper no. 10. Please amend the above-identified application as follows:

**Amendments to the Claims** are reflected in the listing of claims which begins on page 2 of this paper.

**Remarks/Arguments** begin on page 12 of this paper.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below.

Robert F. Bodi

Name of Attorney for Applicant(s)

08-17-2004

Date

Signature of Attorney

5 wherein:

6       S is said electric output signal,

7       A is a predetermined or adjusted value,

8        $|c_n|$  is the amplitude value of the output signal of one of  
9            said sub-microphone arrangements, the transfer  
10          characteristic of which has maximum gain for a value  
11          of said angle at which said desired transfer  
12          characteristic shall have maximum gain as well,

13        $|c_z|$  is the amplitude value of the other of said at least  
14          two sub-microphone arrangements,

15       satB is the saturation of the product  $\underline{[ ]}$  to a  
16          predetermined or adjusted minimum or maximum value  
17          B, and

18        $\alpha$  is a predetermined or adjustable factor.

1       28. (currently amended) The method of claim 20 further  
2           comprising the step of selecting said transfer characteristics  
3           of said at microphone sub-arrangements to have respectively a  
4           maximum gain for acoustical signal impinging on substantially  
5           opposite directions.

1       29. (previously presented) The method of claim 20,  
2           further comprising selecting said transfer characteristics of  
3           said microphone sub-arrangements to be generally of cardioid  
4           shape in polar diagram representation.

1       30. (previously presented) The method of claim 20,  
2           further comprising selecting said transfer characteristics of  
3           said microphone sub-arrangements to be generally of hyper-  
4           cardioid shape in polar diagram representation.

1       31. (previously presented) The method of claim 20 for  
2           establishing a desired transfer characteristic of a hearing

12        a second microphone sub-arrangement having a transfer  
13        characteristic which converts said acoustical input  
14        signal impinging on said second microphone into an  
15        output signal represented by  $c_z$ ; and  
16        generating said electric output signal according to the  
17        equation:

18        
$$S = c_n \cdot \left\{ A - \left[ \alpha \cdot \frac{|c_z|}{|c_n|} \right]_{satB} \right\}$$

19        wherein:

20         $S$  is said electric output signal,  
21         $A$  is a predetermined or adjusted value,  
22         $|c_n|$  is the amplitude value of the output signal  $c_n$ ,  
23         $|c_z|$  is the amplitude value of the output signal  $c_z$ ,  
24         $satB$  is the saturation of the product  $\alpha \cdot \frac{|c_z|}{|c_n|}$  to a  
25        predetermined or adjusted minimum or maximum value  
26         $B$ , and  
27         $\alpha$  is a predetermined or adjustable factor.

1        53. (previously presented) The method of claim 52 wherein  
2        the transfer characteristic of the first microphone sub-  
3        arrangement has maximum gain for a value of said angle at  
4        which said desired transfer characteristic shall have maximum  
5        gain as well.

1        54. (previously presented) A microphone arrangement  
2        implementing the method of claim 52.

1        55. (previously presented) A microphone arrangement  
2        implementing the method of claim 53.

$$\beta = \frac{\left[ \frac{1}{N} \cdot [c_B(0) \cdot c_F(0) + c_B(1) \cdot c_F(1) + c_B(2) \cdot c_F(2) + \dots + c_B(N-1) \cdot c_F(N-1)] \right]}{\frac{1}{N} \cdot [c_B^2(0) + c_B^2(1) + c_B^2(2) + \dots + c_B^2(N-1)]}$$

is properly described as a "ratio of a sum of the products of two signals divided by a sum of the signals squared over an interval [0 , N]", which is generally the description given in col. 7, lines 14-27. Claim 8 of Cezanne further describes a ratio of the "product of output signals of the foreground and background cardioid sensors" to "the square of the output signal of the background cardioid sensor".

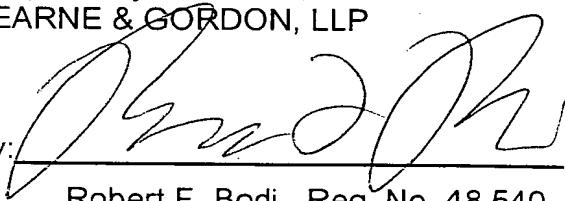
It was agreed by all present at the interview that this is not the same as the language recited in the rejected independent claim 1, i.e., "forming a ratio of said output signals of said first and second microphone sub-arrangements, thereby generating a ratio result". Claim 47 recites similar language at lines 15-17, and thus is patentable over the reference for the same reasons. The remaining rejected claims depend, directly or indirectly, upon one of the above claims, and thus are patentable over the reference for at least the same reasons.

In consideration of the foregoing analysis, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. 32558.

Respectfully submitted,  
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August 17, 2004